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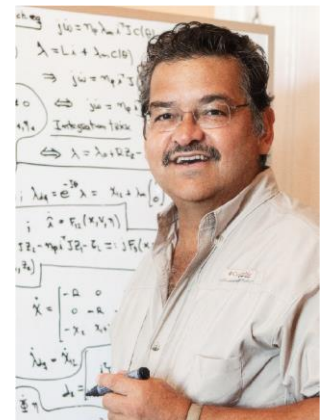
时 间：11月21日（周三）15:10-17:30

地 点：电院群楼2-406会议室

New Results on Identification and Adaptive Control Using Dynamic Regressor Extension and Mixing Parameter Estimation

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Abstract:

A new procedure to design parameter estimators for linear and nonlinear regressions, called dynamic regressor extension and mixing (DREM), was recently proposed. A key feature of DREM is that it transforms the problem of estimation of an q-dimensional parameter vector into the estimation of q decoupled, scalar parameters. The technique has been successfully applied in a variety of identification and adaptive control problems. The connection of DREM with classical functional Luenberger observers for time-varying systems was recently established. In this talk it is shown that, using the DREM technique, it is possible to remove two key assumptions imposed in adaptive control of linear time-invariant multivariable systems. First, for model reference adaptive control, we obviate the need of any prior knowledge on the high frequency gain. For the case of scalar systems this is tantamount to removing the requirement of known sign of this coefficient. Second, we present an adaptive pole-placement scheme that avoids the appearance of singularities that may appear in the calculation of the controller parameters, without appealing to persistency of excitation assumptions nor the use of projections. Besides the use of the new parameter estimator, the only modifications introduced to these classical controller structures are a parameter shifting and a scaling factor that—under suitable excitation assumptions—disappear recovering in this way, the standard schemes.

Biography:

Romeo Ortega obtained his B.S. in Electrical and Mechanical Engineering from the National University of Mexico, Master of Engineering from Polytechnical Institute of Leningrad, USSR, and the Docteur d'Etat from the Politechnical Institute of Grenoble, France in 1974, 1978 and 1984, respectively. He then joined the National University of Mexico, where he worked until 1989. He was a Visiting Professor at the University of Illinois in 1987–1988 and at the McGill University in 1991–1992, and a Fellow of the Japan Society for Promotion of Science in 1990–1991. He has been a member of the French National Researcher Council (CNRS) since June 1992. Currently, he is in the Laboratoire de Signaux et Systemes (SUPELEC) in Paris. His research interests are in the fields of nonlinear and adaptive control, with special emphasis on applications. Dr. Ortega has published three books and more than 250 scientific papers in international journals, with an h-index of 76. He has supervised more than 30 Ph.D.theses.

He is a Fellow Member of the IEEE since 1999 and an IFAC fellow since 2016. He has served as Chairman in several IFAC and IEEE committees and participated in various editorial boards of international journals. Dr. Ortega received the Automatica Paper Prize in 2017, and that work is based on the concept of passivity, a concept introduced by his research group 29 years ago.